U.S. Air Force (Erik Gudmundson)

Armed MQ–9 Reaper unmanned aircraft system in shelter at Joint Base Balad, Iraq

Moving Toward a Joint Acquisition Process to Support ISR

By DEL C. KOSTKA

In 2004, the U.S. Army issued a Critical Mission Needs Statement for a fleet of new unmanned aircraft systems (UAS). The Sky Warrior, as the platform was called, would be the Army's premier extended range, multipurpose UAS to support ground operations. The Army subsequently prepared an operational requirements document to specify performance criteria for the Sky Warrior and submitted its request to the Joint Requirements Oversight Council (JROC), an all-Service panel that conducts requirements analysis, validates mission needs, and recommends priorities for funding.

The request was immediately challenged by the council's Air Force representative. In the Air Force's opinion, its existing MQ–1 Predator UAS, operationally deployed since 1999 and a seasoned veteran of Operations *Enduring Freedom* and *Iraqi Freedom*, could meet all of the Army's requirements with minimal modification.[1] The Army countered that the Air Force's objection was actually a veiled attempt to retain operational control of the air space and be recognized as the "executive agent" for medium- and high-altitude UAS across the entire Department of Defense (DOD).[2] After much debate, the JROC approved the Army's requirement for a new multipurpose UAS despite vigorous opposition from the panel's Air Force contingent.

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By early 2007, the Sky Warrior disagreement had reached a boiling point. On April 19, a congressional hearing convened to review Service budget requests for UAS. The meeting quickly dissolved into a quagmire of questions and confusion. "Who is in charge?" and "Where is the authority?" asked Representative Neil Abercrombie (D–HI), Chairman of the House Armed Services Air and Land Forces Subcommittee. The answer from the Government Accountability Office was that no one in DOD was exercising effective control over the Services' competing programs.[3]

Finally, after 3 years of bickering, the Office of the Secretary of Defense had heard enough. On June 13, 2007, Deputy Defense Secretary Gordon England issued a memorandum upholding the Army's procurement rights for the Sky Warrior, but directing the two Services to form a "joint integrated product team" combining the Predator and Sky Warrior efforts into a single acquisition program.[4] The Army and Air Force have agreed to cooperate in fielding the next generation of medium-altitude, multirole UAS, but the contentious, stovepiped nature of the intelligence, surveillance, and reconnaissance (ISR) acquisition process remains.

The Problem

The inter-Service rivalry over the medium-altitude UAS platform is symbolic of an antiquated funding and acquisition process that does not adequately coordinate, consolidate, and manage the rapidly expanding ISR enterprise. To put it succinctly, DOD does not have a joint, cohesive process to define and validate ISR requirements or efficiently acquire new systems to support warfighter needs.

The significance of this shortfall is immense. Without a unified investment management approach, each Service has aggressively pursued independent ISR capabilities that are tailored to their own unique missions. The Services are not required to jointly develop new ISR systems,[5] and there are vast discrepancies in the way Service requirements are vetted, prioritized, and funded. Efforts to integrate ISR capabilities across DOD are hampered by diverse organizational cultures, independent requirements processes, and different funding mechanisms. As a result, the complex acquisition process through which DOD identifies, procures, and implements advanced ISR systems is characterized by gaps in capabilities, growing competition for assets, and systems that do not fully complement one another.[6]

While the symptoms and impacts of the ISR acquisition process are easy to identify, the exact causes are somewhat harder to determine. Without question, the current process is rife with inefficiencies at virtually every level. Based on the research outlined in this article, the challenges facing the ISR acquisition community manifest themselves in three broad problem areas:

- DOD does not have a comprehensive vision or strategy for the ISR enterprise.
- There is no unified ISR management mechanism to weigh the relative costs, benefits, and risks of proposed investments.
- The current ISR acquisition process promotes requirements definition by individual Service components, which may not have insight into enterprise-level priorities or viable alternatives to acquire the needed intelligence.

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The purpose of this article, then, is to assess and verify these three challenges facing the ISR acquisition community and to recommend changes to improve the integration of ISR capabilities across DOD and national intelligence agencies. The objective is to advocate a joint DOD acquisition process that ensures future ISR investments reflect enterprise-level priorities and strategic goals, while providing a cost-effective baseline of advanced ISR tools, platforms, and capabilities to support tactical operations.

Many organizations play a role in identifying ISR requirements, managing assets, and developing new capabilities. National intelligence agencies such as the National Reconnaissance Office, National Security Agency, and National Geospatial-Intelligence Agency play a vital role in supporting the DOD combat mission and are aligned under both the Secretary of Defense and Director of National Intelligence (DNI). Although the scope of this article is limited to the DOD ISR acquisition process, the national assets are a key component of this examination due to their potential to substitute for or supplement portions of the tactical ISR mission.

ISR Requirements

DOD and the DNI have separate processes to identify future requirements. In the Defense Department, proposals for new ISR capabilities are developed by either the combatant commands or by the individual Services and then submitted to the Joint Capabilities Integration and Development System (JCIDS) for vetting.[7] Within the DNI, proposals for new capabilities are developed by the national intelligence agencies and vetted through the Mission Requirements Board (MRB). Although there is rudimentary coordination between JCIDS and MRB, no standard process exists to determine which DOD proposals will be reviewed by MRB or what criteria will be used to conduct such reviews.[8] The lack of protocol in vetting coincident requirements often puts DOD and DNI at odds. For example, in 2008, JCIDS reviewed a U.S. Central Command (USCENTCOM) requirement for increased surveillance capabilities and determined that the shortfall would be best met by increasing the number of UAS available to the USCENTCOM Service components. MRB determined the exact same requirement could be addressed by efficiency gains in other surveillance methods.[9]

Despite DNI willingness to support tactical missions with national assets, many DOD requirements sponsors are reluctant to consider national systems as an alternative.[10] There are a variety of reasons why DOD insists on acquiring in-house ISR capabilities when national agencies offer a viable alternative. For one, no single source of information exists that specifies the capability and availability of national assets, and even if there were, many in the DOD community lack the security clearance needed to evaluate and select national systems.[11] Trust and control are also an issue, as many within the DOD community are apprehensive about dependence on other system owners.[12]

Defense Acquisition Structure

The DOD defense acquisition structure consists of three interrelated systems that can be described in broad terms as requirements generation, resource allocation, and acquisition management. As mentioned previously, the requirements component is known as JCIDS. Created in 2003, JCIDS is a

DOD-level collaborative process for identifying, assessing, and prioritizing warfighter requirements.[13] Resource allocation is determined through the Planning, Programming, Budgeting, and Execution System, which is the framework through which JCIDS-vetted requirements are evaluated relative to other DOD needs and budgeted in accordance with strategic guidance and fiscal constraints.[14] The third component of the DOD defense acquisition structure is the Defense Acquisition System. As the name implies, this system is the management process by which DOD initiates and oversees the actual procurement of new technologies and programs. The complexity of this three-step process combined with the magnitude of personnel, activities, and funding involved in its operation can result in problems such as redundancy, inefficient operations, fraud/waste/abuse, and inadequate enforcement of laws and regulations.[15]

In DOD, ISR requirements and need statements can be developed by defense agencies, combatant commands, or individual Services in accordance with Title 10 responsibilities to train and equip forces.[16] Prior to its submission into JCIDS, a new ISR requirement must be reviewed and approved by the JROC, a department-level panel chaired by the Vice Chairman of the Joint Chiefs of Staff and including the Vice Chiefs of the Army, Air Force, and Navy, and the Assistant Commandant of the Marine Corps.[17] The charter of the JROC is to assist the Chairman of the Joint Chiefs of Staff in identifying and prioritizing new requirements, consider alternatives to the stated need, and ensure that the priority assigned to the new requirement reflects established strategic guidance.[18] To assist in vetting ISR requirements, the JROC has a special subpanel known as the Battlespace Awareness Functional Capabilities Board.[19] But the JROC does not have any insight into the budgeting process to ensure that JROC-validated programs are adequately funded, nor is there an oversight mechanism to ensure that the Services spend appropriated funds the way the JROC intended.[20]

It is important to note that requirements definition, submission, and vetting comprise a "capabilities-based" process, meaning the combatant command or requirements originator submits the capability shortfall it wishes to address along with the minimum performance criteria needed for the eventual solution. The actual material solution for the submitted requirement is determined by a Functional Solution Analysis,[21] which is the final output of the JCIDS process. In a capabilities-based system, requirements originated by the combatant commands or Service components must be as descriptive and accurate as possible, and baseline performance criteria should be articulated in standard terms and common frames of reference.

Funding Requirements

For budgeting purposes, the various systems that collect, process, and disseminate intelligence are grouped into two major categories of programs, the National Intelligence Program (NIP) and the Military Intelligence Program (MIP). The categories are based on the customer being served, different management arrangements, and different oversight entities in Congress.[22] The NIP encompasses those strategic intelligence programs that specifically support national-level decision-making.[23] NIPs are allocated among national intelligence agencies such as the Central Intelligence Agency, Defense Intelligence Agency, National Reconnaissance Office, National Geospatial-Intelligence Agency, and National Security Agency.[24] The MIP includes those programs that serve the ISR needs of DOD. Some MIP programs are the responsibility of a single defense agency while others are managed by one Service as an "executive agent" for DOD.[25]

The DNI has overall responsibility for preparing NIP budget submissions based on priorities established by the President and with input from the national intelligence agencies.[26] The DNI also participates in the development of the MIP by the Secretary of Defense. Conversely, the Undersecretary of Defense for Intelligence (USD[I]) serves as the MIP Program Executive and also ensures the NIP budget is compliant with DOD strategic objectives.[27] Thus, the DNI and USD(I) play an essential role in the development of both the NIP and MIP. Yet these organizations have limited time and resources and have difficulty reviewing budget requests thoroughly.[28]

U.S. Air Force (Larry E. Reid, Jr.)

Six images on MQ–1 Predator represent number of AGM–114 Hellfire missile shots in combat

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As ISR technologies continue to evolve, the distinctions between the National and the Military Intelligence Programs become increasingly blurred. Some missions, such as space-based radar, are already shared by national and military process owners.[29] Although these mission interdependencies offer substantial opportunities for increased fiscal efficiency, the current budget process presents a number of significant challenges. One is the unintended

consequences of budget adjustments. For example, the elimination of a MIP-funded reconnaissance platform might require a new reliance on a national sensor, which would now be underfunded to perform the additional tasking.[30] Shared funding arrangements present fiscal opportunities, but they have also caused rifts and schedule delays as one entity protests the percentage of funding that it has to provide relative to the other.[31] Also, requirements that are uniquely joint are slow to be identified and filled when no specific Service has the responsibility to initiate a needs statement.[32] Even when potential efficiencies are identified, determining a consolidated plan for funding and operations can be a challenge. For example, space platforms are budgeted under NIP and operated by the national intelligence agencies. The Global Hawk UAS, on the other hand, is budgeted under MIP and operated by the Air Force. These separate paths make it difficult to assess overlaps in capabilities, study tradeoffs, and synchronize operations.[33]

To further complicate the management and coordination of ISR programs, some elements within DOD have turned to supplemental appropriations to obtain intelligence assets that they did not get through the established budget and planning process.[34] One such appropriation vehicle is the Defense Emergency Resource Fund, an initiative that allows DOD to shift funds from a generic counterterrorism fund to specific subaccounts.[35] Although the supplemental appropriation mechanism often results in a Service obtaining a much-needed capability, the practice undercuts the established budgeting and oversight process, making it difficult to weigh tradeoffs and adjust priorities. It also impedes long-term planning and has an erosive effect on efforts to consolidate resources.[36]

The total fiscal budget for ISR programs is difficult to assess due to the classified nature of programs, but the 2008 funding for the national intelligence systems alone exceeded $47 billion.[37] With that type of massive expenditure, the need for operational efficiency and sound decisionmaking is critical. Unfortunately, the current system provides little opportunity to compare costs or make efficiency tradeoffs.

Acquisition Challenges

The unparalleled complexity of the DOD defense acquisition structure lends itself to an abundance of problematic issues.[38] In general terms, the challenges facing the ISR acquisition community can be consolidated into three basic problem statements.

DOD does not have a comprehensive vision or strategy for the ISR enterprise. The lack of a clearly defined, cohesive strategy to guide ISR investments has been a highly visible area of concern for many years. In 1995, the Senate Select Committee on Intelligence recommended a joint review by the Director of Central Intelligence (DCI) and Deputy Secretary of Defense to ensure both DOD and the Intelligence Community were being equally served in the planning, programming, and management of intelligence activities.[39] The 1997 Intelligence Authorization Act included provisions that strengthened the ability of the DCI to participate in budget development for defense-wide and tactical intelligence.[40] As part of the 2004 National Defense Authorization Act, Congress directed the Office of the USD(I) to develop a comprehensive "roadmap" to guide development and integration of DOD ISR capabilities for fiscal years 2004 through 2018. It also called for the creation of an ISR Integration Council to address ISR integration and coordination issues in conjunction with DCI and to contribute to the design of the ISR Roadmap.[41]

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Released in 2005, the ISR Roadmap has provided a multitude of benefits to DOD and the Intelligence Community. First, it has provided a catalogue of both existing and planned ISR systems to help guide investment decisions. It also outlined six specific strategic goals for the future ISR enterprise:

- converge DOD capabilities
- attain persistent surveillance
- achieve horizontal integration of intelligence information
- achieve a collaborative network-centric distributed operations infrastructure
- transform ISR management capabilities
- operationalize intelligence.[42]

Although the ISR Roadmap defines strategic objectives in broad terms, it does not specify future ISR requirements, identify funding priorities, or define a vetting mechanism to ensure Service ISR investments reflect the overall strategy.[43] In short, DOD still lacks a clearly defined vision of the future ISR enterprise to guide its ISR investments.[44]

There is no unified ISR management mechanism to weigh the relative costs, benefits, and risks of proposed investments. The JROC is the current enterprise-level entity for vetting requirements and addressing capability shortfalls across DOD. The agencies, combatant commands, and Services present their mission need statements to the JROC, which then evaluates each candidate requirement on a case-by-case basis. The JROC focus is on Service need and shortfall, however, rather than the capabilities needed to fulfill the mission.[45] Neither the JROC nor its subpanels have the time or technical expertise to fully explore potential options for addressing the ISR capability shortfalls. Also, there is no mechanism in place to identify options, capability gaps, or duplication of effort.[46]

To provide decisionmakers with a mechanism to compare and contrast Service requirements, DOD is compiling an inventory of functional activities known as the Joint Capability Areas (JCAs). Initiated in 2005, the JCAs are a set of standardized definitions of DOD capabilities that are divided into manageable categories.[47] The intent of the JCAs is to establish a common doctrinal language to define needs, analyze gaps in capability, and identify areas where there may be an excess of capabilities.[48] The JCAs have provided a basic framework to evaluate competing Service requirements on a comparable basis.

The JROC and JCAs provide positive momentum toward managing ISR investments from a joint enterprise-level perspective rather than from a single Service point of view. However, DOD as a whole has not established the criteria and methods to identify the best return on investment in light of strategic goals.

The current ISR acquisition process promotes requirements definition by individual Service components that may not have insight into enterprise-level priorities or viable options to acquire the needed intelligence. Since the Goldwater-Nichols Act, the Armed Forces have made extraordinary progress in moving toward a joint and seamless force. Yet this synergy has not extended into the areas of ISR acquisition and management. Entities such as JROC review and validate

funding priorities but have little input into the definition of requirements. Nor does JROC have any oversight of the budgeting process to ensure that its own validated requirements are adequately funded.[49] The Services are ultimately responsible for justifying funding priorities before Congress and maintain both ownership and budgetary control over the resulting ISR assets.

Service ownership of ISR assets presents a number of inherent challenges. First, Service-oriented planning does not consider the full range of solutions available to fulfill operational requirements. At the Service level, requirements managers often lack knowledge about national systems and can even lack the security clearance needed to review and evaluate capability options using national assets.[50] Some process owners have had prior difficulty in tasking national satellites and have complained of poor quality imagery.[51] There is also reluctance on the part of some DOD requirements sponsors to consider national ISR systems as an alternative because they simply do not want to be dependent on another system owner.[52]

At times, Service-based requirements managers have also demonstrated unrealistic expectations of new ISR capabilities and have submitted requirements not consistent with technical levels of maturity.[53] Requirement managers who incorporate ISR technologies that are in the early stages of development increase both the risk and cost of the program, often without any significant enhancement in capability.[54]

A third issue involving Service-oriented ISR planning can be loosely described as "unintended consequences." Many Service-level ISR assets began development without a long-term plan to manage and sustain their programs. As a result, funding and resources are directed toward short-term needs or "gluing" ill-suited and disparate components together in an attempt to force jointness. Also, schedule delays in some programs have forced the Services to make unplanned investments in legacy systems to keep them active longer than expected.[55]

Perhaps the best example of a troubled acquisition program's cascading effect on legacy systems is the Air Force Global Hawk high-altitude UAS. At a cost of $10 million per copy, the Global Hawk was intended to provide cost-effective reconnaissance capabilities similar to the aging U–2 manned platform. The Global Hawk provides an operational advantage over national satellite assets in that it can be tasked by local commanders and launched on demand.[56] Unfortunately, the initial acquisition program had significant shortcomings, as the platform proved to be underpowered and lacked a signals intelligence capability.[57] The Air Force has now funded a $75-million-per-copy upgrade of the initial Global Hawk that includes greater payload and a more robust signals collection capability, but the resulting schedule delay has forced the Air Force to maintain the U–2 program far beyond its projected retirement.[58]

Recommendations

The current DOD acquisition process discourages the consolidation and integration of capabilities across the ISR enterprise. Since requirement and budget definitions are based on stovepiped applications, ISR system developers are forced to integrate capabilities after the fact rather than design efficient and holistic systems from the start. Congress has recognized this deficiency and authorized several significant enhancements to the acquisition process. In 2003, the capabilities-based JCIDS was implemented to submit, review, and validate requirements. The 2004 National Defense Authorization Act directed the USD(I) to develop the ISR Roadmap and created the ISR Integration Council to integrate and coordinate programs across the ISR enterprise. Congress has also restructured the intelligence appropriations process to ensure coordination by the DNI and USD(I).

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Less drastic modifications could also improve the integration and coordination issues that are at the heart of the ISR

Army technicians inspect Shadow 200 unmanned aircraft system upon completion of mission in Afghanistan

U.S. Army (Andrya Hill)

acquisition dilemma. The following recommendations outline three initiatives that the DOD acquisition community could implement to mitigate shortfalls in the current ISR procurement environment. These suggestions are not without controversy, since implementation would inevitably require coordination, resource-sharing, and potential loss of decision authority by select DOD elements. The recommendations are not mutually dependent, however, and can be considered in aggregate to address portions of the ISR acquisition conundrum.

Define an Overall Enterprise Architecture for ISR. A critical shortfall in the current ISR acquisition environment is the absence of a comprehensive and clearly defined enterprise architecture. Without a documented enterprise architecture model, Service requirements managers are essentially making decisions based on their personal perception of the ISR enterprise, which is often not in alignment with the other Service components or the overall strategic direction of DOD.

Within the DOD ISR community, a physical enterprise architecture for interoperability is provided by the Distributed Common Ground System (DCGS), which is a Web-based global intelligence-sharing network that spans the military Services and defense intelligence agencies.[59] Included in the DCGS model is a set of open interface standards known as the DCGS Integration Backbone, which provides a common framework to ensure interoperability, data-sharing, and collaboration among all elements.[60] Although the DCGS outlines a conceptual framework to ensure new ISR capabilities can interact, it does not provide the holistic enterprise architecture in the systems engineering sense needed to assess requirements for new capabilities and make sound investment decisions.

In the systems engineering discipline, an enterprise architecture is simply a documented model of an organization's current (as is) state, its target (to be) state, and a sequencing plan for moving between the two.[61] In addition to a thorough inventory of strategic assets, an ISR enterprise architecture would define organizational components of the ISR enterprise and the interrelationships and interdependencies of those organizations. It would define the ISR mission of each component and document the information needed to achieve that mission. An enterprise architecture would also document a transition process for implementing new technologies in response to changing mission needs.[62]

A managed ISR enterprise architecture would offer benefits to planners, decisionmakers, and those responsible for defining ISR requirements at the Service level. An enterprise architecture would improve communication by providing a standardized vocabulary throughout the ISR community of users. It would provide a mechanism to weigh the benefits and impact of new requirements and support analysis of alternatives, risks, and tradeoffs. It could also help planners discover opportunities to share ISR assets across the enterprise and identify gaps in the current infrastructure that prohibit the sharing of resources.[63]

An enterprise architecture is a living document, so one organization would be tasked with development, implementation, and maintenance of the enterprise architecture lifecycle. A key provision, however, would be full participation and investment by the Service components to document their mission and operations, describe their vision of the future, and help outline an investment and technology strategy for accomplishing their objectives. It is also essential that the ISR enterprise architecture be coordinated and endorsed by the Service chiefs, USD(I), and DNI to ensure ISR acquisition activities are consistent with the strategic vision of DOD and the Intelligence Community.

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Establish Standards and Baseline Capabilities for Sensor Development. At one time, the U.S. defense establishment only acquired systems and equipment that adhered to rigid military specifications and standards. In order to incorporate the rapid expansion of technology over the past quarter century, the defense acquisition community has now adopted an open systems development approach based on commercial specifications and standards. Although the open systems approach has enhanced the performance and capabilities of individual systems, it has also shifted the burden of specification adherence from the acquirer to the developer.[64] This, coupled with fairly loose definitions of open systems standards, has allowed vendors to deliver their own proprietary solutions to performance requirements that are not as open as they appear to be on the surface. The development and documentation of baseline standards specific to the ISR enterprise would dramatically enhance the affordability and interoperability of ISR systems across the enterprise.

The term *standards development* is generally applied to computer systems and network protocols. In actuality, all systems have structures that allow their components and subsystems to work together to achieve the required functionality. Adherence to a well-documented set of baseline standards during the design phase of ISR systems development allows these structures to interact and results in substantial cost savings, interoperability, and efficiency benefits over the life cycle of the program. Although the main goal of baseline standards is interoperability, a standards-based systems development approach could also be applied to database format, data schemas, operating systems, and graphic user interface models. Standardization of this nature reduces development costs, encourages higher levels of performance, provides greater adaptability to evolving requirements, and lowers the risk of technology obsolescence.[65]

Establish a Joint ISR Requirements Agent for DOD. The Intelligence Reform Act of 2003 consolidated ISR program evaluation, assessment, and recommendations under the USD(I).[66] Although this effort reflects a more centralized and coordinated approach to ISR acquisition, actual requirements for ISR capabilities are still originated and defined in accordance with DOD legacy procedures. The establishment of a joint requirements agent to help validate capability gaps and oversee the definition and preparation of requirements would substantially enhance USD(I) oversight of ISR acquisition programs.

A viable candidate for a joint ISR requirements agent is U.S. Strategic Command (USSTRATCOM). In 2003, USSTRATCOM was given the responsibility to plan, integrate, and coordinate ISR in support of DOD operations. To execute this responsibility, the command established the Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance (JFCC–ISR),[67] whose current role is to match customer mission requirements with existing ISR assets and synchronize DOD,

national, and allied ISR collection efforts.[68] Expanding its role to include the validation and preparation of new operational and functional requirements would utilize USSTRATCOM's knowledge of existing ISR assets.

A second option for a joint ISR requirements agent is U.S. Joint Forces Command (USJFCOM). Under this proposal, combatant commands and Service components would be tasked to define requirements and compile mission need statements in conjunction with ISR subject matter experts at USJFCOM. By channeling all new ISR requirements through the command, DOD would take advantage of USJFCOM's established infrastructure for developing, evaluating, and prioritizing interoperable systems.[69] As the existing DOD authority for joint concept and capabilities development, USJFCOM would provide the USD(I) with a ready mechanism to ensure future ISR requirements are defined in accordance with enterprise-level priorities rather than Service-specific opinions.

This article provides a cursory overview of a DOD acquisition environment that struggles to coordinate, consolidate, and manage the rapidly expanding ISR enterprise. It reviews the complex defense acquisition structure, outlines the challenges facing the acquisition process, and recommends changes to improve the integration of new capabilities across the ISR community. None of these suggestions, however, is as important to the goal of an improved joint ISR acquisition process as leadership and the will to implement change. Both DOD and the Intelligence Community have a vested interest in securing a holistic acquisition process that ensures ISR investments reflect enterprise-level priorities. Together, they need to communicate their strategic goals for the acquisition and distribution of ISR resources, clearly map out a plan to achieve these goals, and hold people accountable for meeting them. These are essential ingredients to implementing change and taking full advantage of new and incredibly advanced ISR capabilities. **JFQ**

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